GEO

Guyana Economic Opportunities

MIS Assessment for the Project Cycle Unit

For
Ministry of Finance
Government of Guyana

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INTRODUCTION

As part of the objective to strengthen the overall functional capacity of the Project Cycle Unit, The Guyana Economic Opportunities Project (GEO) wishes to determine the training and technical assistance needs of the Unit. In this vein, a consultancy was established to evaluate the infomatic requirements of the Project Cycle Unit and to develop the procedures for data collection, the business and reporting requirements and the functional specifications for the design, development and implementation of a customised Management Information System.

This document presents the overall concept and approach for the development and implementation of a Project Cycle Information System (PCIS). The proposed solutions in this document, which are based on a series of discussions with relevant staff and the evaluation of current data inputs/outputs, are addressed from a management and computerised procedures perspective. It is a comprehensive document detailing the following:

- Overview of the existing environment
- The overall concept of a proposed Project Cycle Information System
- The system architecture required to support the proposed management information
- The business functions of the proposed information system
- The constraints affecting the implementation and usage of the management information system
- The benefits of a comprehensive Project Cycle Information System.
- The feasibility of implementing this type of Management Information System.

The primary goal is to implement a management information system which will allow easy data inputs and facilitate the production of timely reports. The proposed system will be written using industry standard, modern computer languages and database techniques, and a flexible design that will allow for expansion as the needs evolve and the skills base improves within the Ministry of Finance.

BACKGROUND

The Project Cycle Unit of the Ministry of Finance as part of its overall information technology objective, has recognised the need for a Management Information System to effectively support the ability of the Unit to monitor the implementation, execution and completion of bilateral, multilateral and regional projects.

The objective of this exercise therefore is to evaluate the informatic and reporting requirements that will form the basis of an improved Management Information System.

The document therefore outlines the following:

Environmental Analysis:	*An examination of the current technical and operational environment within the Project Cycle Unit*.
Information System Concept:	*Design and Functional Specifications of the information system, the base data requirements, the technical environment required, the skills base and training needs required.*
Benefits Analysis:	*An analysis of the overall benefit of implementing a Project Cycle Information System*
Feasibility:	*A concise analysis of the feasibility of the proposed system*

This document is targeted at managers. Knowledge of computer systems, while helpful, is not a prerequisite.

I. Analysis of the Current Environment

I.1 Data Collection & Storage

The collection and maintenance of data is still primarily a manual process within the Project Cycle Unit. All records are maintained in hard copy files. Most of the information reviewed appears to be well structured and in standard formats that are easily understood. Project status information, although comprehensive in most instances, would require some level of standardisation.

All discussions and observations clearly indicate that the Project Cycle Unit maintains and generates a substantial amount of information. The method of information management however, is simply not sustainable over the long term.
This is because of the following:

- Information maintained manually becomes unwieldy and difficult to manage as it evolves. The problems of access and retrieval increase over time.
- There is no centralised records/files management system. Therefore the responsibility of file maintenance is left to individual officers within the Unit. This can sometimes delay information sharing when this is required.

- Some of the processes as they pertain to projects (i.e. Project status, List of Activities, Financial transactions) are in some instances in separate files. While this is as a result of the specific roles of some of the officers in the Unit, it makes data collecting and reporting time consuming.

- There are potential problems with effective storage as projects increase and evolve over the long term.

There is also no evidence of any policy mandate or directive that applies specifically to the dissemination of information within the unit and the relevant divisions within the Ministry and/or external agencies. Information appears to be sent upon request but without any structured guidelines or established formats.
Some officers have indicated that while the Project Execution Units (PEU) should send information to them directly, in many instances it is sent elsewhere within the unit, thus forcing the officers to search for the required information.

I.2 Existing Information Systems

The division currently uses an Alpha IV database management system to record and store all project profiles. The system has no real flexibility beyond data storage. Any reports requested have to be designed and built on most occasions. Information pertaining to project performance (i.e. Status reports, potential problems etc.) are not recorded. It would also be useful to have a systems module specifically designed to record and track the disbursement schedules as per project. The informatic requirements of this unit need

to be clearly defined so as to facilitate the design, development and implementation of an integrated, responsive, user-friendly management information system.
The Head of the Project Cycle Unit is in agreement with this assessment, and has already provided some preliminary specifications for review and analysis.

I.3 Reporting and Related Outputs

All the reports examined are concise and comprehensive. The problem appears to be with the time that it takes to generate them. For example, the capital expenditure reports for the preparation of the annual budget are a tedious exercise. The processes such as additional data entry, the export and import of data from one file format to another are time consuming and a constant strain on existing resources. Requests for reports from donors also cause similar delays. There are many instances with the daily functions of the unit come to a grinding halt because of the time-consuming data research, compilation and reporting required by the IMF, World Bank or IDB on an ad hoc basis. An information system that generates these reports based on multiple and varied criteria (i.e. by economic sector, by government agency, by donor, etc) with the press of a button or a click of the mouse would allow staff more time to effectively execute the functional requirements of the Unit.

I.4. Computer literacy

With a few exceptions, the skills level in the division does not go beyond the use of Word-processing, spreadsheet applications and data entry when and where required. While this might be sufficient in most instances, it becomes a serious concern when it comes to the operation of management information systems. Training therefore is a major component of any move to a more comprehensive management information solution.

I.5 Systems Support

One very positive aspect of this assessment is the fact the Ministry of Finance's Management Information System Unit (MISU) is still a strong, high qualified unit within the Ministry. What this means therefore is that the informatic solutions that will be proposed will have strong in-house technical support in the short to medium term. Long-term sustainability must take into account however that the majority of staff currently in MISU are in the final months and/or years of their scholarship contracts with the Government of Guyana. It is uncertain how many of the technical staff will remain once their contracts end.

I.6 Technical Environment (Hardware)

There are two computer workstations in the Project Cycle Unit. Three more computers are scheduled to be allocated and the networking infrastructure in place indicates that the unit will be part of a Local/Wide Area Network at the Ministry of Finance.

I.7 Staff Training

Like many other divisions within this ministry, there are acute staff shortages in many areas. As indicated above, the computer skills that exist do not go beyond word processing and basic support for the existing project profile information system. The Head of the Project Cycle has indicated the need for extensive training and recruitment of staff.

II. The Proposed Management Information System

This section of the document provides a technical overview of the proposed information management system. The functional specifications presented, along with the relevant entity-relationship diagrams, will provide a clear and concise illustration of the functions and services provided by the system. This overall concept assumes the following:

- That all evaluated divisions will have access to the ministry-wide Local Area Network (LAN).
- That the responsibilities of data maintenance and reporting will be clearly defined within the Project Cycle Unit.

Also outlined in this section is the overall systems architecture under which the proposed system will operate and support the relevant organisational units.

II.1 *Overview*

The information management system proposed is a Project Cycle Information System that will support the informatic requirements of the Project Cycle Unit and relevant divisions/agencies. This database management information system will allow key staff to have easy and timely access to all project information, capital disbursements per project, project activities and other related data. Some of the properties of this system are as follows:

- Standard Data Formats will be established for consistent data entry and retrieval of information.
- The information system will be designed to facilitate concurrent and remote access.
- Standard reports will be designed to be generated upon request or as selected (i.e. monthly, quarterly or end-of-year) An Ad Hoc Reporting utility with be implemented to facilitate individual requests.

The primary business functions of the system will be as follows:

- The recording and storage of comprehensive project profiles more in accordance and an extension to the information currently being maintained in manual files.
- The recording and storage of activity schedules either in detail or summary per project profile.
- The facility to attach all correspondence and relevant documentation as it relates to specific project profiles.
- The ability to enter and process reimbursements for selected Capital Releases (this applies primarily to programmes like the PL-480 and some CIDA projects. In the new system projects will have to be identified as being eligible for reimbursement)
- The ability to record and provide electronic support for the physical monitoring of projects

- The ability to generate financial and physical status reports for budget preparation and donors

The overall benefits will be as follows:

- **Storage:** There does not appear to be any structured records management and file storage procedures. Information therefore would be far easier to maintain in an electronic format.
- **Access:** Information will be easily retrieved using structured data searches and ad hoc queries.
- **Reporting:** Reports would be generated easily upon request on a regulated basis from a fully integrated system.

The overall objective would be to implement an Information System that would allow the division to enter project related data on a monthly, quarterly or half-yearly basis. From this system, standard reports can be generated and ad hoc reports can be built upon request. There would be no instances of divisions and/or external agencies waiting for reports to be delivered. They will all be able to access required information individually and at will.

II.2. *Architecture and Operating Environment*

The Project Cycle Information System will comprise of many sub-systems, which will support the data requirements of the Unit. This section outlines the proposed architecture, operating environment and the overall requirements under which this application must effectively operate.

Systems Management

The data administration, maintenance and application support of the proposed system will be the responsibility of the Management Information System Unit of the Ministry of Finance. The MISU will also co-ordinate the implementation of all modifications and enhancements, monitor performance and regulate and manage policies pertaining to data access and manipulation.

Networked (Multi-user) Access

The proposed application must be installed on a Local Area Network (LAN) so as to facilitate multi-user access. As part of the overall restructuring plan at the Ministry of Finance, the LAN currently in operation is now being extended to include the main building of the Ministry. The system can therefore reside on one of the file servers on the network and provide informatic support to the relevant divisions.

External Access

It is envisioned that future releases of the Project Cycle Information System will facilitate external access by selected agencies. It is likely that the following external entities would require limited access to the Project Cycle Information System:

- Project Execution Units
- Line Ministries

The means of data communications to the Ministry of Finance have not yet been finalised. One of the primary reasons is that high performance data lines are not available from the local telecommunications provider. Over the short term however, dial-up connectivity via data modems is adequate for access. The following diagram outlines the technical environment under which the proposed system will operate.

Compatibility

- It is recommended that the system run on the Microsoft's SQL Server database engine to store and process data on the server(s). This would be in keeping with the current direction of the MISU. This will also allow the MISU to make future modifications in-house if required.
- The server portion of the system will operate under the Windows NT Server networking operation system.
- The client portion of the system must be able to run under Windows 95/98 or Windows NT workstations.
- The client portion of the system must offer seamless integration with the Microsoft Office Suite.
- An Ad Hoc report writer must be available and should have the capability to transfer data to third party software packages such as Excel, Microsoft Word, and other formats such as ASCII, etc.

Maintainability

- The system/application should be fully century (i.e. Year 2000) compliant
- Applications should represent the latest version releases, complete with all updates and appropriate documentation.

Performance

- The system must be written as a client server application to distribute the processing of information between the workstations and the server.
- The system must implement stored procedures on the database.

Network Security

The system will require methods, procedures, and/or administrative tools, which will permit the MISU to monitor and control access to the application by unauthorised personnel. Given the fact the system may be accessed by external agencies, auditing capabilities must be developed to provide the MISU network administrator with the ability to detect unauthorised access.

Operating System Security

The system will require that its operating system (OS) have the capability of verifying all logins through a password protection mechanism. These capabilities include the ability to protect directories and/or files, the ability to enforce password change schedules, and the use of administrative tools to ease network administration overhead associated with OS-level security must be compatible with other levels of security to provide a manageable environment.

Database Enforced Security

The system requires the data security at the lowest level must be enforced through the recommended MS SQL database engine.

Application Enforced Security

The system requires the data security at the application level will provide consistent and comprehensive means to protect data from unauthorised access view, modification or deletion. These protections should be User login dependent.

Applications should provide complete audit trail facilities for transactions, as well as integrity checks on manually entered information. Valid users should be defined in the system with option for account expiration and password aging by the system

Documentation

It is expected that the vendor(s) of the application and/or sub-system will provide full and comprehensive documentation for any operational procedures and functions implemented. Technical documentation for any customisation and/or modifications after deployment shall be provided.

User documentation shall be available in hard copy, as well as on-line form.
The Users should be provided with a feature that will permit examination of all application features on-line.

Interface(s)

Future releases of the Project Cycle Information System should eventually interface with the core financial systems of the Ministry of Finance. The level of the interface to be developed will depend on the architecture of the financial system in existence and/or to be implemented. In the absence of the required architecture, import and file conversion routines can be developed to facilitate the exchange of information.

Data Volumes and Workloads

Data Volumes and workloads cannot be ascertained until final data requirements are established and guidelines are also established for the collection and dissemination of required information.

Hardware Requirements

The basic hardware requirements for the implementation of the proposed system are well within the established hardware specifications of the MISU at the Ministry of Finance. The MISU will have to ensure and certify that the machines used for communications access at the external agencies meet the specified hardware requirements. It is estimated that between five (5) and (6) computers will be required for the effective utilisation of the Project Cycle Information System.

Network and Communication Requirements

Plans for the extension of the Local Area Network (LAN) currently in existence at the Ministry of Finance, which would include support for all the divisions/units, will be implemented upon the completion of physical infrastructure repairs currently in progress. This would have to be the basis on which the proposed system would be implemented. Specifically, the management information system will reside on a file server that will be accessed via the LAN installed.

Dial-up connectivity would eventually have to be established for the external agencies. Overall, the nature of the data connectivity to the information systems at the Ministry of Finance has not been finalised. This appears to be primarily because of the currently prohibitive costs of the high performance data lines required. Until this is finalised, however, dial-up connectivity using normal phone lines can be configured and implemented.

Summary

The user interfaces provided in the proposed system must provide easy access to all relevant information and reports with the least amount of keystrokes. Menus and Data entry/edit screens must be flexible and intuitive, requiring only the minimum amount of training necessary for day-to-day operations. Documentation help must be provided as an informative reference during day-to-day operation. Ad Hoc query utilities are

provided so as to facilitate flexibility and accuracy in reporting. These reports can be generated either to the screen, printer or user defined text files. Extensive reference files are maintained so as to provide users with easy to access to agency wide information.

II.3 *Users*

It is envisioned that the following agencies may use the proposed systems to either input or access information. It should be noted that the Project Cycle Unit would determine the level of access.

- Project Cycle Unit
- Project Execution Unit (PEUs)
- Chief Planning Officer
- Office of the Budget
- Macroeconomic Unit

II.4 *Definition of System Functions*

The following is an overview of the system functions required for the Project Cycle Information System. These include the following:

II.4.1 Security Access Controls

- Systems Settings and Restrictions
- Establishment of User Profiles
- Security Levels Settings based on users/group

II.4.2 Reference Listings

- Division Listings
- Agency Listings
- Economic Sector Listings
- Expenditure head & sub-head listings
- Regional Listings

II.4.3 Project Cycle Data Maintenance

- Maintain Information on Projects (Pipeline & Execution)
- Enter Schedule of Activities per project
- Enter budgetary allocations per project
- Enter Disbursement (Capital Releases)Information per project
- Derive total Capital Expenditure per project
- Enter status information on individual projects

II.4.4 Reports

- Annual Capital Expenditure report for budget preparation
- Project Profile listings by selected categories
- Expenditure reports by selected categories

- Activity listings by regions
- Loan reports by donors, economic sector, government agencies,
- Grant reports by donors, economic sector, government agencies
- Physical Monitoring Reports per projects

II.4.5 System Validations

- All general releases to be attached to projects
- General Releases per project to be based on listed activities
- All activities to be attached to existing project profiles
- Supervisory and management level password required to modify listed/established activities
- Supervisory and management level password required to modify budgetary allocations

The following diagram(s) illustrates a functional overview of the Project Management Information System. Also included are illustrations of the supporting Local Area Network (LAN)

II.5 Data Requirements

This section of the document provides the base data requirements for the proposed Project Management Information System. The data dictionary presents an outline of the proposed data elements for the databases. It should be noted that the tables represent base requirements and are presented primarily for informative reference only. Final data definations would have to be established during the preliminary stages of system design and implementation and more importantly, after comprehensive discussions with users.

Table 1: Project Cycle Profile Database

Data Elements	Description
Identification Number	Unique Identifier for each project
Agency Code Number	Executing Agency Code Number
Sector Code Number	Economic Sector Code Number
Rank	Overall Rank based on sectoral priorities and objectives criteria
Score	Overall Score based on sectoral Priorities and objectives criteria
Title	Title of Project
Classification	Level of Need e.g. Critical, Essential etc.
Region	Regions (1-10)
Agency	Executing Agency (i.e PEUs, Ministries.etc)
Status	Current Status of Project (new or existing)
Duration	Planned Duration of the Project
Description	Description of the Project
Benefits	Benefits of the project and the jeopardy avoided
Project Cost	Total Project Cost
Expenditure to date	Amount spent before current costs
Budgeted Amount	Amount budgeted for the current year
Total Direct Foreign Expenditure	Total direct foreign expenditure by the executing agency & direct foreign expenditure by the executing agency
Financing-Foreign	Total financing by loans/grants
Financing-Central Government	Total financing by the central government
Financing-Local Agencies	Total amount to be financed by local agencies
Foreign Financing Source	Source of Overseas Financing
Central Government Source	Source of Central Government Financing
Skilled Workers	Number of skilled workers to be employed
Unskilled Workers	Number of unskilled workers to be employed

Table 2: Disbursement Database

Data Elements	Description
Identification Number	Unique Identifier for each project (linked as a key field to table 1)
Disbursement Date	Date of Capital Release
Amount Disbursed	Amount disbursed on the Project
Amount budgeted	Verification field extracted from table 3: Activities Database
Activity	Activity for which disbursement is applied…Verification field from table 3 Activity database

Table 3: Activities Database

Data Elements	Description
Indentification Number	Unique Identifier for each project. (linked as a key field to table 1)
Activity	Description of Activity
Location	Location of Activity
Region	Administrative Region where activity is going to be conducted
Cost	Estimated Cost/Amount Budgeted
Start Date	Projected Start Date
End Date	Projected End Date

Table 4: Agency Reference Database

Data Elements	Description
Agency Code	Code Number assigned to the executing agency
Name	Name of executing agency
Notes	Any relevant information pertaining to the executing agency (this is a variable text field)

Table 5: Economic Sector Database

Data Elements	Description
Sector Code	Code Number assigned to the executing agency
Name	Name of Economic Sector
Notes	Any relevant information pertaining to the economic sector

Table 6: Physical Monitoring Database

This table cannot be defined until the Project Cycle Unit begins to standardize inputs for physical monitoring. Projects have different levels of monitoring at the unit. This is based on whether these projects are bi-lateral, multi-lateral or regional. These databases will be finalised during the implementation phase.

III. IMPLEMENTATION

This section outlines the proposed workplan for the implementation of the the first phase of the Project Cycle Information System. The workplan will be based on phased approach that will ensure the required level of comfort with the new system, its successful completion and sustainability over the long term.

III.1 WORKPLAN

Activity	Objective(s)	Duration
1. Data Definition	To meet with all relevant staff to establish an understanding of and concurrence with the proposed data tables, elements, database schema and data entry screens	3-5 days
2. Development of Project Profile module	To build and test all databases,data entry scree n to facilitate the input of project profiles	15-20 days
3. Development of Project Activities module	To build and test the databases, data entry screens, design the interfaces to the Project Module and facilitate input project related activities	15-20 days
4. Development of Capital Releases and monitoring modules	To build and test the databases, data entry screens, design the interfaces to the Project Module and facilitate input project related activities	15-20 days
5. Development of Physical Monitoring Module	To build and test the databases, data entry screens, design the interfaces to the Project Module and facilitate input project related monitoring data for validation	Depends on the levels of data normalisation within the Unit.
6. Installing and Testing of all modules	Full product completion and full installation of information system.	3-5 days
7.Staff Training	To ensure that all staff have	5 days

	a working and administrative knowledge of all aspects of the new system	
8.Provision of System Documentation and User Manuals	Staff must have an easy and informatic reference available for day-to-day operations	

Notes to the Workplan

- After Activities 2,3,4,5 there will be periods of data entry,processing and testing by the staff within the unit. This ensures that the staff are constantly a part of the implementation process.
- Staff training will be spread over the installation of each module. This reduces to a large extent the overall learning curve required by the Project Management System.
- Each activity 2-5 is an independent component. Each one will begin only after the successful implementation, acceptance and utilisition of the previous one.

III.2 Implementation Phases & Requirements

Phase I: Design and Implementation of primary Information Management System

Requirements for implementation

- Availability of computers as per recommendation
- Availability of file/data server
- Connectivity to Local Area Network (LAN)

Acceptance and Evaluation of Phase I

Phase 2: Design of Interface for external access

Requirements for implementation

- Availability of telephone lines for modem access
- Computers at the Project Execution Unit (PEUs) with data modems

Acceptance and Evaluation of Phase 2

Phase 3: Seemless Integration with the Microsoft Office Suite and the accounting and budgeting systems at the Ministry of Finance

Requirements for Implementation

- Systematic procedures for Document routing and control and Workflow management

- Integrated accounting and budgeting system in operation at the Ministry of Finance.

Acceptance and Evaluation of Phase 3

III.3 Project Staffing

The proposed staff requirements for the implementation of Project Cycle Information System are as follows:

- One (1) Programmer/Analyst (serves as Project Manager)
- One (1) Programmer
- One Documentation Specialist

IV. Feasibility

This section provides an analysis of the feasibility of implementing the Project Cycle Information System.

Implementation Requirements

The successful implementation of the Project Cycle Information System would depend on many factors. These include:

- The effective determination and implementation of adequate pace and levels of training, support and knowledge transfer levels with system users and MIS personnel.
- The provision of additional human resources (if required) to ensure an effective implementation of the new system
- The ability to 'market' the system the new system to the potential users
- The provision of hardware/software as recommended in this report
- The establishment of rules and regulations pertaining to the production of standard inputs and outputs within the unit.

Implementation Risks

- Inadequate MOF senior level project sponsorship
- Inadequate user training for, and support during, system implementation
- Low technology absorption rate by system users
- Failure to provide the required hardware/software support required for implementation.
- High staff turnover/migration rates by system users
- Implementation inflexibility

IV. Conclusion

It is important that the Project Cycle Unit understands clearly that the process of computerisation must be participatory. The centralised computerisation of Project Cycle Unit represents a fundamental shift in operations that will impact both staff and systems. As such it requires the involvement, understanding and commitment of all concerned. With this in mind it is important to note the following:

- There must be consensus among the relevant staff on the nature of the information system. There must be absolute agreement on the data elements for the tables, formats for the data screens, etc.
- Responsibilities for the input of monthly, quarterly or half yearly data must be clearly defined. Those information sources must develop an appreciation for the timeliness of information and the discipline to input it.
- Functional capacity must be strengthened, Using high end management information systems is a fundamental shift from word-processing and spreadsheet packages

The implementation of the system, if approved will not be without some teething problems. The Ministry of Finance is not unlike other agencies with its weaknesses in specific skills in certain areas. What will ultimately sustain this effort is the commitment of the decision-makers within the unit, and by extension, the Ministry of Finance.